Finally, in future proceedings the FCC will be developing technical standards and operational policies for the commercial use of the 746-806 MHz band. The proximity of that spectrum to this public safety allocation may provide unique capabilities and opportunities for public safety agencies to augment their capacity in the 746-806 MHz band. Motorola therefore recommends that the FCC consider how it can further encourage voluntary priority access by future commercial services in the 746-806 MHz when those allocations are more thoroughly considered.[41]

VI. CONCLUSION

Motorola strongly supports the allocation of additional public safety spectrum in the 746-806 MHz band and urges the Commission to move forward rapidly and allow public safety users to obtain access to much needed spectrum relief. In allocating this spectrum, Motorola urges the Commission to: (i) specifically designate 10 channels in the new band for mutual aid, with rules and policies similar to the NPSPAC channels in the existing 800 MHz band; (ii) adopt a flexible regulatory approach for interoperability that recognizes the valuable contribution of regional planning committees; (iii) consistent with the recommendations of PSWAC, mandate the use of a baseline interoperability mode for analog voice, but allow public safety users and organizations to pursue independently further standards for digital voice, trunking, and advanced services; (iv) adopt service rules and TV protection criteria that facilitate public safety use of the band, consistent with the recommendations in Appendix A hereto; and, (v) clarify the legal obligations and rights of CMRS providers to offer priority access services to public safety users. These

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[41] The types of commercial services to be implemented in the 746-806 MHz band is not yet settled. Commercial services outside the scope of CMRS (such as broadcast stations or mobile satellite services) will need specific priority access considerations.

measures would provide much needed relief for public safety users, enhancing their ability to discharge efficiently and effectively their obligation to ensure the safety of life and property.

Respectfully Submitted,

Richard C. Barth /MCL

Richard C. Barth
Director of Telecommunications Strategy
and Regulation
Motorola, Inc.
1350 Eye Street, NW
Washington, DC 20005
(202) 371-6959

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APPENDIX

TECHNICAL RECOMMENDATIONS

FOR THE 746-806 MHZ

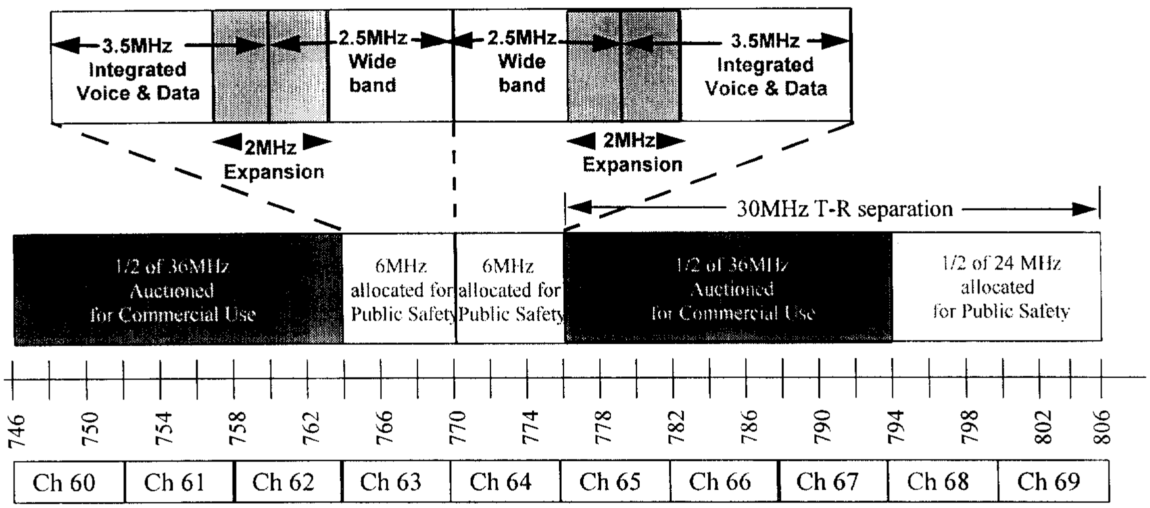
PUBLIC SAFETY BAND

Motorola

December 23, 1997

1. **746-806 MHz Public Safety Spectrum Allocation**

Motorola proposes the following band plan for the public safety allocation in 746-806 MHz:



The 794-806 MHz band should be designated as a mobile station transmit band paired with the 764-776 MHz band as the mobile station receive band. This will maximize the early availability of spectrum in major markets and locates the public safety mobile station transmit band immediately adjacent to the mobile station transmit band at 806-824 MHz which will minimize interference potential.

Within the transmit and receive bands there is a further division of the spectrum. Integrated voice and data systems should be allotted 7 MHz in each band. This allotment supports 6.25,12.5 and 25 kHz systems. This spectrum will be used to meet the short term need for expansion of current 12.5 and 25 kHz systems while providing a migration path to spectrally efficient 6.25 kHz systems. The 14 MHz (7 megahertz times two) allocation for these systems meets the needs defined in the Public Safety Wireless Advisory Council (PSWAC) report for voice and low speed data through 2010.

Motorola also recommends that the FCC designate 5 MHz allotments in both the transmit and receive bands for wideband systems. The primary use of this allocation is for image and file transfer as well as video.

Some of these applications will require a much higher bit rate in one direction than the other. An option for these type of systems is to use a wideband channel in one direction and a narrowband integrated voice and data channel in the other direction. If the need for wideband outbound channels is equal to the need for wideband inbound channels, the spectrum will be fully used. However, if more wideband outbound channels are needed, an inbound/outbound imbalance will exist. One approach that can be used to alleviate this issue is to also put wideband fixed station transmitters in the mobile station transmit band. While this has the potential to cause interference between the wideband fixed station transmitters and the fixed station receivers which normally will be in this band, interference can be minimized by the use of separate sites, guardbanding, geographic coordination, transmitter filtering and low power fixed stations. There is also the potential for interference between mobile station transmitters normally assigned to this part of the band and mobile station receivers for the one way system. Where possible, it is desirable to use contiguous channels for one way systems to minimize interference problems. Due to these interference issues, initial allocations for wideband outbound systems should only be made in the mobile station receive band.

As it will be necessary for public safety to share spectrum with TV during the transition to full public safety use, both wideband and integrated voice and data services should be allocated in each 6 MHz TV channel. This will enable all services to be deployed as soon as a single channel pair is available for public safety use.

One megahertz of both the integrated voice and data and the wideband allocation is designated as a 2 MHz region “expansion” band. The purpose of this region is to allow some flexibility based on demand for the two services. This area will only be used once there is no more spectrum available for one of the services. This part of the band can then be used for whichever service is out of spectrum.

The availability of both of the service types in a sharing situation is a function of both interference conditions to TV incumbents as well as interference to public safety systems from these incumbents, as addressed in section 5. It is shown in section 5.5.2 that the required spacing between full power NTSC TV stations and public safety mobile stations must be large to limit interference to public safety users on or near the picture and sound carriers. However, operation outside approximately ± 200 kHz from these carriers is possible with minimal interference. Thus, in these sharing situations, both services will still be available due to their positioning within the 6 MHz band.

Within the integrated voice and data allocation, it is proposed that some of the spectrum will be allocated for interoperability channels. Part of the wideband allocation will also be reserved for interoperability. However, allocations for interoperability should be done by regional planning groups and not through FCC rules to maintain flexibility of spectrum use.

There are two reasons to separate voice/data applications from the wideband applications. If narrowband channels are allocated throughout the band, there is a danger that the band will become fragmented with narrowband channels scattered throughout the entire band resulting in no available contiguous spectrum for wideband systems. Second, it has been found that putting narrowband channels next to wideband channels requires a significant guardband, resulting in poor overall use of the spectrum.

2. Integrated Voice and Data Allocation

2.1 Block Allocations

To ease transmitter combining at a site, it is desirable to separate the channels to be combined by an amount adequate to allow low loss cavity combining. A frequency separation of 500 kHz is practical with today's cavity combiners.

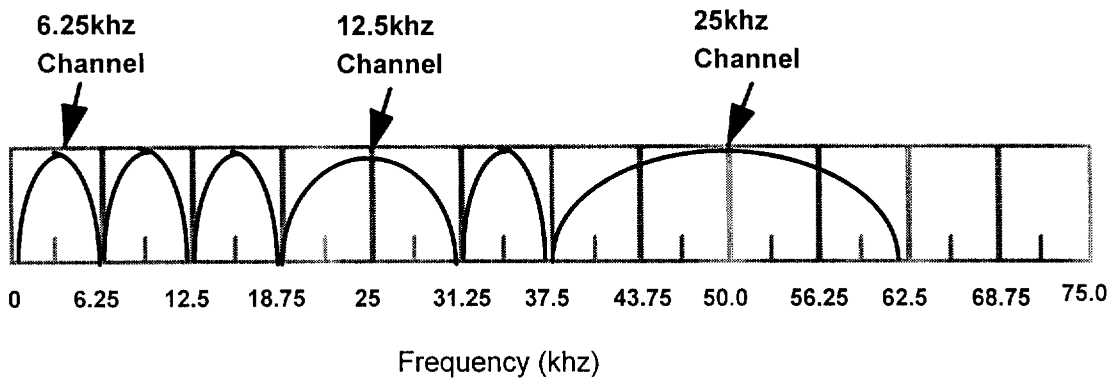
Therefore, each initially available 2.5 MHz integrated voice and data block should be divided into five 500 kHz blocks. If 5 channels are required at a site, the first available channel from each block should be utilized. If more than 5 channels are required, a second group of 5 channels at the alternate channel to the first 5 will also be assigned. Groups of 5 combined channels can then use separate antennas or be further combined through the use of RF hybrids.

Although block allocations are expected to be the primary method of allocating channels for a single site, for some types of equipment and some types of systems, contiguous channel assignments are advantageous. These type of allocations should be permitted, provided the system meets emission requirements at the edges of it's channel allocation which is consistent with existing FCC policy for wideband transmission.

2.2 Channels for Integrated Voice and Data

The channeling requirements for this part of the band are proposed to be defined so that a variety of existing technologies (25 kHz analog FM, 12.5 kHz digital, 19.2 kbps FM data, etc.) could coexist initially while at the same time providing for a smooth transition to even more spectrally efficient systems in the future. An integral part of this concept is that narrow channels will form the basis for the plan but that public safety licensees will routinely aggregate these basis channels to meet their needs as they arise and are justified.

The figures below show the overall band plan for the integrated voice and data allocation with a random assignment of signals with different bandwidths. The gray boxes indicate the 6.25 kHz channel allocations. As can be seen, a 25 kHz channel requires four 6.25 kHz allocations and a 12.5 kHz allocation requires two 6.25 kHz allocations. Any bandwidth system can exist next to any other system in this plan without guardbands. It can be seen that channel centers on 3.125 kHz increments are required to implement this approach.



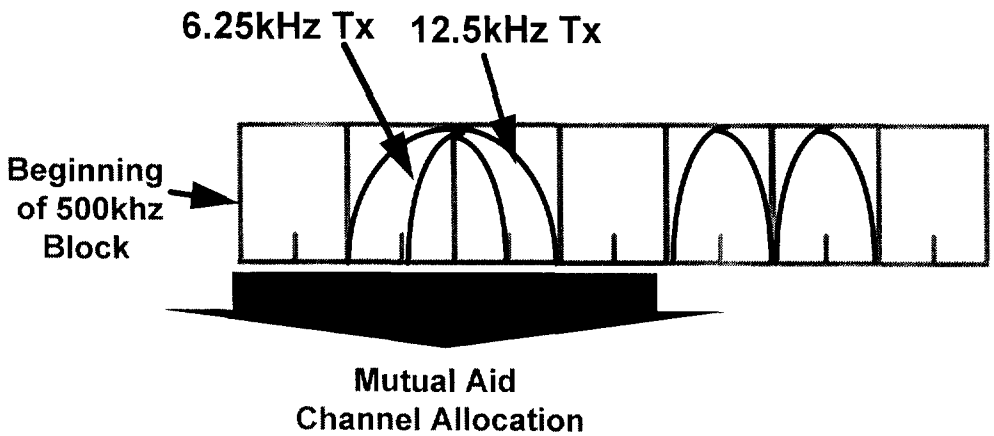
In order to allow this efficient allocation of spectrum, the coupled power into the first 6.25 kHz channel adjacent to an allocated channel is not required to be small. (the term "coupled power" used herein is defined as between equipment i.e., no propagation loss factor). The coupled power into this first channel is required to be less than -40 dBc. However, in order to gain this spectrum use efficiency, systems on these adjacent channels will require geographic planning (coordination) to provide sufficient geographical spacing to ensure non-interference between systems. Beyond the adjacent channel, a lower value of coupled power is required. This lower value of coupled power, in conjunction with mobile station power control, minimizes the need for geographic planning beyond the adjacent channel.

2.3 **Mutual Aid Channels**

It is desirable in some public safety systems to provide mutual aid channels to allow for interoperability between different public safety entities. Given that the number of required channels is not yet defined, it is recommended that the National Public Safety Telecommunications Council (NPSTC) and regional planning groups be given the responsibility for deciding quantities and specific frequencies, rather than attempting to codify into the FCC service. However, some considerations and approaches are outlined below for use by regional planning groups that need to implement mutual aid channels.

The overall band approach outlined above specifies -40 dBc coupled power in the adjacent channel and the use of geographic coordination to insure non-interference between adjacent channels. If a mutual aid channel is needed and must cover a wide geographic area, no adjacent 6.25 kHz channels should be allocated in that area so that interference is minimized. Additionally, as systems are transitioned from 12.5 kHz to 6.25 kHz, interoperability is desired between these systems. The following proposal addresses these issues by defining mutual aid channels that provide interoperability by the use of a compatible modulation scheme and the use of a specific frequency allocation plan that minimizes interference.

The first four 6.25 kHz channels should be assigned as mutual aid channels in every 500 kHz block. The actual channel center will be at the far edge of the second 6.25 kHz channel, allowing either 12.5 or 6.25 kHz modulation as shown below. This approach also provides a guardband above and below. The fifth channel can then be used as either a 6.25 kHz channel or as the lower of two channels for a 12.5 kHz transmitter.



This should allow the mutual aid channels to have improved coupled power relative to the other channels.

If there is a requirement for more mutual aid channels, then mutual aid allocations could be made every 250 kHz while still retaining the guardband method shown above.

2.4 Transmitter Coupled Power Requirements

The transmitter out of band requirements for this band have been specified differently than other bands. This has been done for two reasons. The new specifications define requirements that more directly relate to system design parameters. The definition of absolute and relative levels of coupled power as a function of frequency should result in systems that operate with more predictable and lower levels of interference. This new approach for specification should also eliminate some of the interpretation problems associated with current approaches that use masks and depend on specific spectrum analyzer characteristics.

The coupled power requirements for transmitters were defined for 6.25 kHz, 12.5 kHz and 25 kHz channels as shown in the following tables. Mobile station requirements are meant to apply to handheld, car mounted and control station units. The tables specify a maximum value for the coupled power relative to maximum output power as a function of the displacement from the allocated channel's center frequency. However, the absolute coupled power out of a mobile station transmitter at the specified frequency displacement must also be less than the value shown in the tables. If the mobile stations have power control, the maximum absolute coupled power requirement can be met at maximum power reduction. If the mobile station does not have power control, the maximum absolute coupled power requirement must be met at maximum power. This specification allows meeting the interference requirements by achieving good out of band splatter or through the use of power control. Fixed stations are assumed not to have power control.

2.4.1 **Mobile Station Transmitter Requirements**

6.25 kHz Mobile Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Max Coupled Power at Maximum Tx Power	Maximum Coupled Power Under Maximum Power Reduction
6.25 kHz	6.25 kHz	-40 dBc	-
12.5	6.25	-60	-45 dBm
18.75	6.25	-60	-45
25	6.25	-65	-50
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 kHz *	-75	-55
In the receive band	30 kHz *	-100	-70

* Swept measurement - see section 2.4.3

12.5 kHz Mobile Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Max Coupled Power at Maximum Tx Power	Maximum Coupled Power Under Maximum Power Reduction
9.375 kHz	6.25 kHz	-40 dBc	-
15.625	6.25	-60	-45 dBm
21.875	6.25	-60	-45
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 kHz*	-75	-55
In the receive band	30 kHz*	-100	-70

* Swept measurement - see section 2.4.3

25 kHz Mobile Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Max Coupled Power at Maximum Tx Power	Maximum Coupled Power Under Maximum Power Reduction
15.625 kHz	6.25 kHz	-40 dBc	-
21.875	6.25	-60	-45dBm
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30 kHz*	-75	-55
In the receive band	30 kHz*	-100	-70

* Swept measurement - see section 2.4.3

2.4.2 **Fixed Station Transmitter Requirements**

6.25 kHz Fixed Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Maximum Coupled Power
6.25 kHz	6.25 kHz	-40 dBc
12.5	6.25	-60
18.75	6.25	-60
25	6.25	-65
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 kHz*	-80 (continues @-6dB/oct)
In the receive band	30 kHz*	-100

* Swept measurement - see section 2.4.3

12.5 kHz Fixed Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Maximum Coupled Power
9.375 kHz	6.25 kHz	-40dBc
15.625	6.25	-60
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 kHz*	-80 (continues @-6dB/oct)
In the receive band	30 kHz*	-100

* Swept measurement - see section 2.4.3

25 kHz Fixed Station Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Maximum Coupled Power
15.625 kHz	6.25	-40dBc
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30 kHz*	-80 (continues @-6dB/oct)
In the receive band	30 kHz*	-100

* Swept measurement - see section 2.4.3

2.4.3 **Detailed Measurement Procedure**

[Note: "measurement bandwidth" used below implies an instrument that measures the power in many narrow bandwidths (e.g. 300 Hz) and integrates these powers across a larger band to determine power in the measurement bandwidth]

Motorola proposes that the following procedure be used in making transmitter measurements. For TDMA systems, the measurements are to be made under TDMA operation only during time slots when the transmitter is on. All measurements are to be made at the input to the transmitter's antenna.

Coupled Power Measurements

- *Setting reference level:* Using a spectrum analyzer capable of adjacent channel power measurements, set the measurement bandwidth to the channel bandwidth. In other words, for a 6.25 kHz transmitter, set the measurement bandwidth to 6.25 kHz; for a 12.5 kHz transmitter, set the measurement bandwidth to 12.5 kHz; etc. Set the frequency offset of the measurement bandwidth to 0 Hz and adjust the center frequency of the spectrum analyzer to give the power level in the measurement bandwidth. Record this power level in dBm as the "reference power level".

- *Measuring the power level at frequency offsets <400 kHz:* Using a spectrum analyzer capable of adjacent channel power measurements, set the measurement bandwidth as shown in the tables above. Measure the power in dBm. This measurement should be made at maximum power. Calculate the coupled power by subtracting the measurements made in this step from the reference power measured in the previous step. The coupled power values must be less than the values given in the table for each condition above.

Measuring the coupled power at frequency offsets >400 kHz

- Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz Video bandwidth and sample mode detection. Sweep +/- 6 MHz from the carrier frequency. Set the reference level to the RMS value of the transmitter power and note the absolute power. The response at frequencies greater than 400 kHz must be at least -70 dBc (-75dBc for fixed stations) with respect to the on-channel response.

Upper Power Limit Measurement

- The absolute coupled power in dBm measured above should be compared to the table entry for each given frequency offset. For those mobile stations with power control, the above measurements should be repeated with power control set at maximum power reduction. The absolute coupled power at maximum power reduction must be less than the table entry.

2.5 Mobile Station Power Control Requirements

Those mobile stations using power control to meet the transmitter spectral requirements should be required to meet the following requirements. The mobile station transmitter power output control algorithm should be such that the signal received at the fixed station site on the desired channel is held at -85dBm or less over the power control dynamic range and then held at the maximum power reduction. The power received at the fixed station site is to be referenced to the input of the first amplifier after the receive antenna.

2.6 Control Station Power Control Requirements

Control stations with excessive ERP are a potential source of interference. Therefore, control stations should be equipped with automatic power control circuitry and control algorithms such that the control station's power output is reduced until the power received at the fixed station site is -85dBm or less. The power received at the fixed station site is to be referenced to the input of the first amplifier after the receive antenna.

2.7 Frequency Stability Requirements

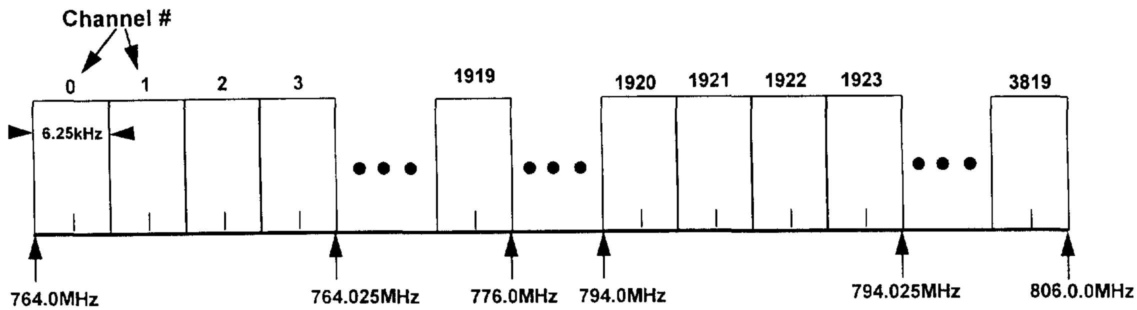
The fixed station transmitter frequency error should be less than 100 ppb.

The mobile station transmitter frequency error should be less than 300Hz. This frequency shift can, however, be achieved through the use of an AFC scheme that locks onto the fixed station's signal. However, the mobile station needs to have a reasonable level of stability for modes of operation when it is not able to lock onto a fixed station's transmitter. Therefore, mobile stations must have a frequency error of less than 2.5ppm when AFC is not active.

Trunking control stations are defined to be mobile stations that must lock onto a fixed station's signal and are only required to conform to mobile station frequency stability requirements.

2.8 Channel Numbering

In order to simplify identifying specific frequencies, a numbering scheme should be implemented that indicates 6.25 kHz channels.. Channel numbering should start with channel number 0 which extends for 6.25 kHz from 764 MHz to 764.00625 MHz. The channel number increases with increasing frequency. Channels are numbered from 0 to 1919 in the mobile station receive band, which extends from 764 MHz to 776 MHz. Although these channels are normally paired with channels in the 794 MHz to 806 MHz band, the channels in this band should be uniquely numbered to allow for systems which need more spectrum in one band compared to the other. Therefore, the first channel in the mobile station transmit band will be numbered 1920 and will extend from 794 MHz to 794.00625 MHz. Channel numbers will increase with increasing frequency to channel number 3819, which extends from 805.99375 MHz to 806 MHz. To simplify the designation of assignments requiring multiple 6.25 kHz channels, the total number of slots should be indicated after the channel number. For example, if an assignment requires four 6.25 kHz channels, beginning with channel 200, the notation will be 200;4. This will indicate the assignment of channels 200, 201, 202 and 203. In most cases, an assignment of channels 2120, 2121, 2122 and 2123 in the mobile station transmit band will also be required.



2.9 Transmitter Power Limitations

Mobiles should be limited to a maximum transmitter power of 30 watts average into the antenna during transmission (or during a slot for TDMA operation). Portables should be limited to a maximum transmitter power of 3 watts average into the antenna during transmission (or during a slot for TDMA operation).

No specific power output limitations should be applied to fixed stations. Fixed station power output should be limited through geographic coordination of co-channel users by the appropriate public safety regional coordinators. (Fixed station power limitations during the transition from TV to public safety are covered in section 5.0)

2.10. Geographic Frequency Coordination

The methodology defined below should be used for this band. This methodology provides for good coverage for a system while providing adequate protection for co-channel users. It must be remembered that parameters here are recommendations for public safety systems, which generally require higher reliability and greater interference protection to mission critical systems and services.

1. A desired signal level of 40 dBu at the service area edge plus 3 miles should be planned as defined in TIA TR8,WG8.8 guidelines.

2. The above design should be evaluated and modified if necessary such that the following criteria is met: The desired signal level must be 5 dBu median level maximum at "worst-square mile" of the co-channel neighbors service area(s) into a receiver bandwidth equivalent to that used in the co-channel.

3. The level defined in item 1 can be exceeded provided that the protections defined in item 2 remain satisfied.

4. For non-co-channel interference scenarios, increase the allowable field strength of item 2. by an amount equal to the coupled power for the particular configuration of concern.

The guidelines above are modeled after the approach taken at 821-824 MHz. Some minor differences do exist, however. The 40dBu, 3 miles beyond the service area is the same as 821-824 MHz. However, the planning methodology has been updated to reflect the latest industry standard (TIA TR8 WG8.8). The 5dBu at the co-channel service area is also the same as 821-824 MHz. Item 3 is a slight modification of the 821-824 MHz methodology allowing more signal level at the service area edge as long as there is no significant co-channel interference.

2.11 Channel Loading Requirements

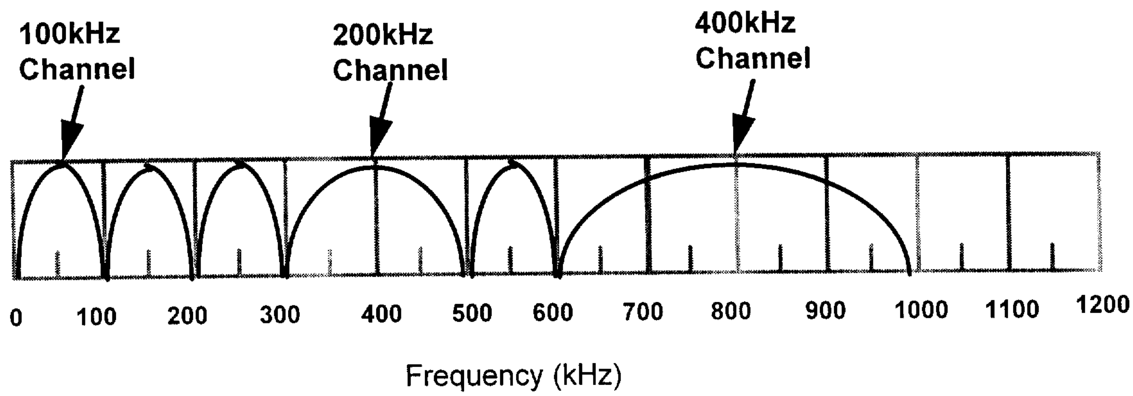
Channel loading requirements should not be defined in the FCC rules. However, public safety regional planning groups should develop guidelines to ensure efficient use of the available spectrum.

3. Wideband Allocation

3.1 Channels for Wideband

The requirements for this part of the band were defined such that various systems (100, 200 kHz etc.) could be implemented. This is necessary since the system that best meets the user needs has not yet been determined. This should also allow upgrading of systems over time as the requirements increase.

The figure below shows the overall band allocation for wideband systems with a random assignment of various width signals. The gray boxes indicate the 100 kHz channel allocations. As can be seen, a 200 kHz channel requires two 100 kHz allocations. Other bandwidth allocations will be defined as multiples of 100 kHz channels. Any bandwidth system can exist next to any other system in this plan without guardbands.



In order to allow this efficient allocation of spectrum, the coupled power into the first 100 kHz channel adjacent to an allocated channel is not required to be small. (the term "coupled power" used herein is defined as between equipment i.e. no propagation loss factor). The coupled power into this first channel is required to be less than -40dBc. However, in order to gain this spectrum use efficiency, systems on these adjacent channels will require geographic planning (coordination) to provide sufficient geographical spacing to ensure non-interference between systems. Beyond the adjacent channel, a lower value of coupled power is required. This lower value of coupled power, in conjunction with mobile station power control, minimizes the need for geographic planning beyond the adjacent channel.

3.2 Transmitter Coupled Power Requirements

The transmitter out of band requirements for this band have been specified differently than other bands. This has been done for two reasons. The new specifications define requirements that more directly relate to system design parameters. The definition of absolute and relative levels of coupled power as a function of frequency should result in systems that operate with more predictable and lower levels of interference. This new approach for specification should also eliminate some of the interpretation problems associated with current approaches that use masks and depend on specifics of the spectrum analyzer.

The requirements for transmitters were defined for 100 kHz and 200 kHz channels as shown in the tables that follow. Mobile station requirements are meant to apply to both handheld and car mounted units. The tables specify a maximum value for the coupled power relative to maximum output power as a function of the displacement from the allocated channels center frequency. However, the absolute coupled power out of a mobile station transmitter at the specified frequency displacement must also be less than the value shown in the tables. If the mobile stations have power control, the maximum absolute coupled power requirement can be met at maximum power reduction. If the mobile station does not have power control, the maximum absolute coupled power requirement must be met at maximum power. This specification allows meeting the interference requirements by achieving good out of band splatter or through the use of power control. Fixed stations are assumed not to have power control.

3.2.1 **Mobile Station Transmitter Requirements**

The requirements for transmitted signals for 100 kHz and 200 kHz channels are shown in the tables below:

100 kHz Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Max Coupled Power at Maximum Tx Power	Maximum Coupled Power Under Maximum Power Reduction
100 kHz	50 kHz	-40dBc	-
200	50	-50	-35dBm
300	50	-50	-35
400	50	-50	-35
600 to 1 MHz	30*	-60	-45
1 MHz to receive band	30*	-70	-55
In the receive band	30*	-100	-75

* Swept measurement - see section 3.2.4

200 kHz Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Max Coupled Power at Maximum Tx Power	Maximum Coupled Power Under Maximum Power Reduction
150 kHz	50 kHz	-40	-
250	50	-50	-35dBm
350	50	-50	-35
600 to 1 MHz	30*	-60	-45
1 MHz to receive band	30*	-70	-55
In the receive band	30*	-100	-75

* Swept measurement - see section 3.2.4

3.2 .2 **Fixed Station Transmitter Requirements**

100 kHz Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Maximum Coupled Power
100 kHz	50 kHz	-40dBc
200	50	-50
300	50	-55
400	50	-60
600 to 1 MHz	30*	-65
1 MHz to receive band	30*	-75 (continues @ -6dB/oct)
In the receive band	30*	-100

* Swept measurement - see section 3.2.4

200 kHz Transmitter Requirements

Frequency Offset from Channel Center Frequency	Measurement Bandwidth	Maximum Coupled Power
150 kHz	50 kHz	-40
250	50	-50
350	50	-55
600 to 1 MHz	30*	-65
1 MHz to receive band	30*	-75dB(continues @ -6dB/oct)
In the receive band	30*	-100

* Swept measurement - see section 3.2.4

3.2.3 **Wider Bandwidth Allocations**

Channel allocations that are larger multiples of 100 kHz can also be made, but the system must meet the following requirements.

Mobile Station Requirements

Wider bandwidth channels can be defined with the requirement that the coupled power measured in a 50 kHz bandwidth is less than -40dBc at maximum power at the closest 100 kHz allocation that could be made outside the defined allocation, -50dBc at maximum power (and -35dBm at maximum power reduction) where a second 100 kHz allocation could be made. In addition, the following requirements must be met when measured in a 30 kHz resolution bandwidth: -60dBc at maximum power(and -45dBm at maximum power reduction) , at frequencies 600 kHz to 1 MHz away from the center of the desired channel, -70dBc at maximum power(and -55dBm at maximum power reduction) at frequencies >1 MHz to the receive band and -100dBc at maximum power (and -75dBm at maximum power reduction) anywhere in the receive band.

Fixed Station Requirements

Wider bandwidth systems must also meet the following requirement: The coupled power measured in a 50 kHz bandwidth is less than -40dBc at the closest 100 kHz allocation that could be made outside the defined allocation, -50dBc where a second 100 kHz allocation could be made, -55dBc at the third 100 kHz allocation. At 600 kHz to 1 MHz, the coupled power measured in a 30 kHz resolution bandwidth should be less than -65dBc. At frequencies of 1 MHz to the receive band the coupled power measured in a 30 kHz resolution bandwidth should be less than -75dBc and should improve at 6dB/octave or greater and must reach -100dBc anywhere in the receive band.

3.2.4 **Detailed Measurement Procedure**

[Note: "measurement bandwidth" used below implies an instrument that measures the power in many narrow bandwidths (e.g. 300 Hz) and integrates these powers across a larger band to determine power in the measurement bandwidth]

The following procedures are proposed for making transmitter measurements. For TDMA systems, the measurements are to be made under TDMA operation only during time slots when the transmitter is on. All measurements are to be made at the input to the transmitter's antenna.

Coupled Power Measurements

- *Setting reference level:* Using a spectrum analyzer capable of adjacent channel power measurements, set the measurement bandwidth to the channel bandwidth. In other words, for a 100 kHz transmitter, set the measurement bandwidth to 100 kHz; for a 200 kHz transmitter, set the measurement bandwidth to 200 kHz; etc. Set the frequency offset of the measurement bandwidth to 0 Hz and adjust the center frequency of the spectrum analyzer to give the power level in the measurement bandwidth. Record this power level in dBm as the "reference power level".

- *Measuring the power level at frequency offsets <600 kHz*: Using a spectrum analyzer capable of adjacent channel power measurements, set the measurement bandwidth as shown in the tables above. Measure the power in dBm. These measurements should be made at maximum power. Calculate the coupled power by subtracting the measurements made in this step from the reference power measured in the previous step. The absolute coupled power values must be less than the values given in the table for each condition above.

Measuring the coupled power at frequency offsets >600 kHz

- Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz Video bandwidth and sample mode detection. Sweep +/- 6 MHz from the carrier frequency. Set the reference level to the RMS value of the transmitter power and note the absolute power. The response at frequencies greater than 600 kHz must be less than the values in the tables above.

Upper Power Limit Measurement

- The absolute coupled power in dBm measured above should be compared to the table entry for each given frequency offset. For those mobile stations with power control, these measurements should be repeated with power control at maximum power reduction. The absolute coupled power at maximum power reduction must be less than the values in the tables above.

3.3 Mobile Station Power Control Requirements

Those mobile stations using power control to meet the transmitter spectral requirements should also be required to meet the following requirements. The mobile station transmitter power output control algorithm should be such that the signal received at the fixed station site on the desired channel is held at -75dBm or less over the power control dynamic range and then held at the maximum power reduction. The power received at the fixed station site is to be referenced to the input of the first amplifier after the receive antenna.

3.4 Control Station Power Control Requirements

Control stations should be equipped with automatic power control circuitry and control algorithms such that the control station power output is reduced until the power received at the fixed station site is -75dBm or less. The power received at the fixed station site is to be referenced to the input of the first amplifier after the receive antenna.

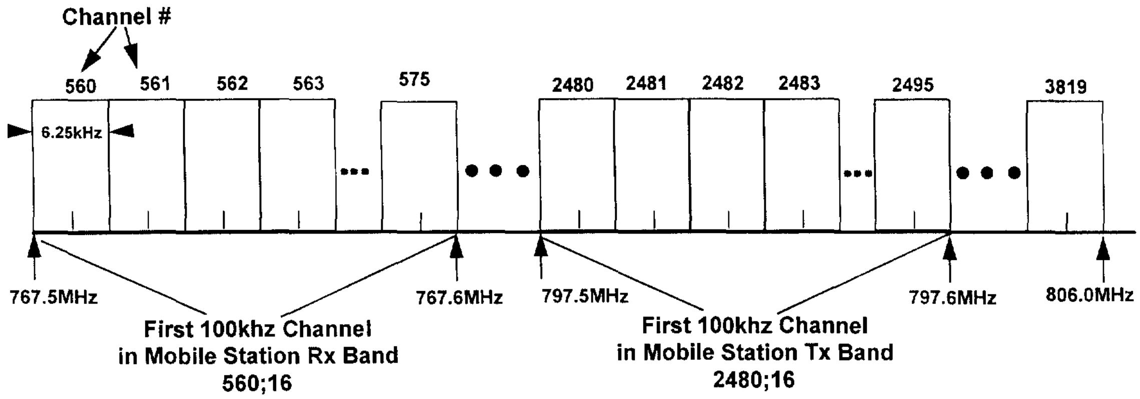
3.5 Frequency Stability Requirements

The fixed station transmitter frequency error should be less than 1 ppm.

The mobile station transmitter frequency error should be less than 1 kHz. This frequency error can, however, be achieved through the use of an AFC scheme that locks onto the fixed station's signal. However, mobile stations must have a frequency error of less than 5 ppm when AFC is not active.

3.6 Frequency Numbering

Wideband channel numbering should use the same basic numbering scheme as the integrated voice and data channels. However, since the minimum allocation is 100 kHz, they can only be allocated in groups of 16. Thus, the first 100 kHz wideband channel in the mobile station receive band is 560;16, the second is 576;16 etc. These channels will typically be paired with channels 2480;16 and 2496;16 in the mobile station transmit band. Channels in the expansion area, such as those in the examples above, will not be allocated until no other wideband channels are available.



3.7 Transmitter Power Limitations

Mobiles should be limited to a maximum transmitter power of 30 watts average into the antenna during transmission (or during a slot for TDMA operation). Portables should be limited to a maximum transmitter power of 3 watts average into the antenna during transmission (or during a slot for TDMA operation).

No specific power output limitations should be applied to fixed stations. Fixed station power output should be limited through geographic coordination of co-channel users by the appropriate public safety regional coordinators. . (Fixed station power limitations during the transition from TV to public safety are covered in section 5.0)

3.8 Geographic Frequency Coordination

The methodology defined below should be used for this band. This methodology provides for good coverage for a system while providing adequate protection for co-channel users. It must be remembered that parameters here are recommendations for public safety systems, which generally require higher reliability and greater interference protection to mission critical systems and services.

1. A desired signal level of 50 dBu at the service area edge plus 3 miles should be planned using the approaches defined in TIA TR8,WG8.8 guidelines. The 50dBu requirement increases the signal level by 10dB over that required for the narrower voice/data service, in order to keep approximately the same signal to noise ratio for the wider band system.

2. The desired signal level should be 15 dBu median level maximum at "worst-square mile" of the co-channel neighbors service area(s) into a receiver bandwidth equivalent to that used in the neighbor system. The 15dBu increases the allowable signal level at the co-channel neighbor service area